REMARKS FOR ADMINISTRATOR BOLDEN

RESERVE OFFICERS ASSOCIATION

NATIONAL SECURITY SYMPOSIUM

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Thank you, GEN. Davis. It's an honor to share the podium with such distinguished company as you, GEN. Petraeus and Mr. O'Hanlon.

When I embarked on a military career nearly 50 years ago as a boy fresh out of high school, I had no idea where that path would lead me. I wanted to follow in the footsteps of my father and my uncles, men who had served with distinction in World War II. I am proud to say that my son, Ché, also followed me into the Marine Corps, now a LTCOL stationed at the Pentagon.

My military career opened vistas that I never could have dreamed possible when I was a student in the segregated South trying to live up to the high ideals of my parents to get a good education and pursue my dreams.

Like me, many of our astronauts have come from the military, precisely for the skills and values that the military helps us develop.

While we are a civil space agency, NASA, DoD, and the national security apparatus share many of the same technologies. We share many of the same enabling systems; we share a common industrial base; we have similar facility needs; and we have similar workforce needs. We have many differences, too, but the key to cooperation is to work together to overcome the challenges and focus on activities that benefit both organizations.

NASA has also utilized Air Force-unique launch support for missions for which commercial capability was not available, such as the Cassini mission that required the performance of the Air Force Titan IV.

Our partnership with DoD in the development and use of the current Evolved Expendable Launch Vehicle, or EELV**,** fleet is helping to sustain the industrial base necessary to ensure that DoD has the access to space it needs.

At the same time we're encouraging and facilitating the development of domestic commercial launch providers.

NASA and DoD have a long-standing practice of sharing facilities. As you know, a number of NASA Centers are co-located with DoD bases. The relationships between Langley Research Center and Langley Air Force Base, Dryden Flight Research Center and Edwards Air Force Base, the Kennedy Space Center and Cape Canaveral Air Force Station are all very strong, with NASA and DoD organizations sharing facilities, operations support contracts, and flight operations mission support.

Goddard Space Flight Center, just east of DC, has a global network of satellite communication and downlink facilities. It shares resources with DoD in far-reaching places like Ascension Island, Antarctica, and Guam. Goddard also operates a joint center for the development and validation of space weather models and instruments in cooperation with the Air Force and others.

We recognize that space weather information is vital to military commanders and space scientists for planning and anomaly resolution. Finally, the Goldstone Deep Space Network has a downlink site at the National Training Center in Ft. Irwin, California.

As most of you know, we recently retired our flagship program, the space shuttle, after 30 spectacular years of flight and 135 missions. That's more flights by far than any other human space flight program. Through its triumphs and tragedies, it gave our nation many firsts and many proud moments.

The Defense Department flew 11 dedicated missions on the Space Shuttle. The first was STS-4 in June 1982, and the last was STS-53 in December 1992. NASA is also proud to have provided space access to about 270 secondary DoD payloads, most on the Shuttle middeck or in the cargo bay.

The shuttle also launched communications satellites that helped make the whole world more secure and helped establish a deep space communication network.

Satisfying the increased reliance of today's high-bandwidth systems with space-based communications continues to be a DoD priority and these same systems fulfill a critical communications role in the International Space Station program.

Future investment in communications is a priority for both DoD and NASA. The technological advances promised by optical and laser communications systems show great potential. NASA and DoD are collaborating to field new capabilities as quickly as possible to meet the needs of both agencies.

With respect to the shuttle, it was time for us to get out of the business of owning the infrastructure to reach low Earth orbit when industry was rapidly developing the capabilities to do that. As we hand access to LEO off to industry, NASA can focus on the bigger picture horizon and do those things that no one else can do right now.

We are turning to development of the transportation systems and spacecraft necessary for crew to explore beyond low Earth orbit such as *Orion* and the Space Launch System.

We are also pursuing the development of technologies such as in-space propulsion, space-based assembly, deep-space habitats, closed loop life support and many others that will be critical to getting humans to an asteroid and Mars as President Obama has challenged us to do.

Right now, it is true that we are dependent on the Russians to get our crews to the International Space Station (ISS), but our industry partners are meeting milestones and making steady progress toward getting crews and cargo to space so that we only have to rely on this foreign outsourcing for as short a period is possible. When the decision was made to retire the shuttle back in 2004, we always knew there would be a gap in our spaceflight capability.

In a few months, however, SpaceX and Orbital Sciences will launch their *Dragon and Cygnus* capsules, respectively, to berth with the ISS, something that is being done on a "commercial" basis for the first time. This follows the successful launch, orbit, and recovery of a SpaceX *Dragon* at the end of 2010.

I've also seen Sierra Nevada's *Dream Chaser* vehicle in Boulder, Colorado. I've been to Blue Origin in Washington and seen their launch abort system and the *New Shepard* vehicle that will fly experiments into suborbital space. I've visited the new Horizontal Integration Facility at our Wallops Flight Facility in Virginia that will support medium-class mission capabilities, with Orbital as its first customer, as part of the Mid Atlantic Regional Spaceport.

Boeing will be processing its low Earth transport system in what was formerly our Orbiter Processing Facility at Kennedy. I've visited Lockheed Martin in Denver and seen first-hand their work on *Orion*, our crew module for deep space exploration.

So, yes, it all feels very real to me, and more commercial companies developing viable options to low Earth orbit makes us more secure.

Even as we facilitate industry's creation of this brand new, job-creating sector of the economy, we're focusing on the capabilities for those bigger missions. American launch capability is going to be better than ever.

We're upgrading our Kennedy Space Center in Florida and making it more flexible so that it can accommodate a wider range of users and we can win back some of the launch business we've lost overseas.

Kennedy is going to launch the Space Launch System, our new heavy lift rocket to carry humans to deep space. At the Stennis Space Center, MS we're test firing components of the rocket now, repurposing shuttle engines to give us a leg up on testing, and making the most of the workforce and infrastructure we already possess to bring this massive project to reality in the coming decade.

We envision an evolvable rocket capable of multiple types of missions, and varying sizes of payloads, so that other users besides NASA will benefit, and the cost will be less for all.

President Obama has given us a Mission with a capital "M" -- to focus again on the big picture of exploration and the crucial research and development that will be required for us to move beyond low Earth orbit. He's charged us with carrying out the inspiring missions that only NASA can do, which will take us farther than we've ever been – ultimately a human mission to Mars.

Ever since we got our roadmap forward in the form of the NASA Authorization Act of 2010, we've been moving toward the missions of tomorrow and the capabilities we'll need to visit new places, launch cutting edge science missions and help develop the next generation of aviation systems from which we'll all benefit.

The president is asking us to harness that American spirit of innovation, the drive to solve problems and create capabilities that is so embedded in our story and has led us to the moon, to great observatories, and to humans living and working in space, possibly indefinitely.

We strive to seed innovation – to facilitate the kind of environment where space robots like the NASA/General Motors-developed humanoid robot called Robonaut-2 (R-2) will provide new technologies for robot systems that create a human-like presence in space through telepresence control systems. R-2 is aboard the ISS now as its first robotic crewmember.

It's easy to forget that all of the dollars we spend to get to space are spent here on Earth. That may seem obvious, but when you're talking about spacecraft hurtling millions of miles away into the solar system or even 400 miles above us like the Hubble Space Telescope, we must remember that it’s people who designed and operate them. People are currently orbiting on the ISS 24/7 and they have done so for more than 11 years now.

Many of the technologies we develop to explore have a big impact to quality of life across the globe. One of the most tangible ways we impact people's lives on a daily basis is in aeronautics, the first A in NASA.

NASA continues to lay the foundation for the future of flight by exploring new ways to manage air traffic, build more fuel-efficient and environmentally friendly airliners, and ensure aviation's outstanding safety record. U.S. companies are well positioned to build on discoveries and knowledge resulting from NASA research, turning them into commercial products; improving the quality of life for everyone; providing new high-quality engineering and manufacturing job opportunities; and enabling the United States to remain competitive in the global economy.

We're interested in the aircraft of the future, too. Through our Green Flight Challenge, for instance, we recently awarded a prize to Pipistrel-USA for its electric plane demonstration.

NASA also has supported development of the Next Generation Air Transportation System, or NextGen, in partnership with the DoD, Homeland Security, and the Federal Aviation Administration through the Joint Planning and Development Office, or JPDO.

Secure, network-centered operations are a key emphasis of NextGen, which will be much more scalable and flexible than today's system. This means improved and increased network communications among the various people and machines, aircraft, and computers involved in the air transportation system.

Autonomy will also play a much greater role in NextGen, especially use of Unmanned Aircraft Systems, or UAS. There is an increasing need to fly UAS in the National Airspace System to perform missions of vital importance to national security and defense, emergency management and science, and to enable commercial applications.

NASA is working with these same partners -- DoD, DHS, and FAA -- to iron out operational issues for easier access today of UAS to the airspace for public use missions.

For the longer term, we are evaluating key technologies and concepts needed to integrate UAS in civil airspace, and generating data for regulators to support development of stringent UAS air-worthiness certification standards.

We just completed development with other JPDO members of a national UAS research, development, and demonstration roadmap for UAS access to our national airspace. This roadmap highlighted the joint partnership's ongoing activities and coordination and is helping to set the course for needed future investments across the community.

This longer-term research will further enable the DOD and DHS to operate UAS in national airspace for national security missions, and enhance the technology available in the market.

Another significant way that NASA contributes to national security is through its partnership with the Defense Department and other space agencies around the world to track orbital debris and monitor space weather such as solar flares.

Knowing what’s in space and what’s going on, is critical to DoD as it migrates more high-value capabilities to space. The ability to monitor systems and understand potential threats to these systems is a growing area of concern to the national security community.

NASA’s experience with both ground- and space-based systems has the potential to assist DoD in this growing mission area. NASA investments in improved sensors, higher spatial resolution, broader area coverage, and finer spectral coverage are some of the activities that have potential benefits.

Our Orbital Debris Program Office at the Johnson Space Center in Houston has been working for 30 years to ensure that we're safe in space and on the ground. NASA is playing a leading role in this effort for the entire government. The U.S. Strategic Command tracks about 22,000 major pieces of space debris, and updates their status every 8 hours in relation to the International Space Station, but NASA also is aware of more than a million smaller pieces of debris.

Some of these articles only we can see with our telescopes and other monitoring equipment and only we can characterize their environment and potential impacts.

The Iridium and Cosmos collision several years ago shows that space is not as big as once thought. The number of objects in space is growing and we need to improve our catalog and tracking ability. So far we've been doing a pretty good job with this enormous quantity of data. But it's not just risk to the ISS. We've also had to do avoidance maneuvers with some of our Earth observation satellites and last year one of the TDRSS satellites in geosynchronous orbit as well. Given that these contribute to our health and well being in many ways, from continuity of data, to rapid information about natural disasters, that most definitely qualifies as national security.

When I first launched to space, the Cold War was in its waning years, but most of the first generation of the space program was defined by that paradigm.

I'm proud to say that I commanded our first joint shuttle mission with a Russian Cosmonaut, Sergei Krikalev, as a mission specialist crewmember.

That mission, STS-60, stands among many other milestones in space diplomacy and was a precursor to perhaps the crowning achievement of international cooperation of all time – the construction of the International Space Station by 16 nations – demonstrating the potential for space to unite us as a world – something more important today than ever.

If everyone could see the world from space, see how it is one planet without political borders, serene in its unity, perhaps there would be less conflict. While we're working on greater access to space, we are pursuing a path of big missions and big projects that demand cooperation, across our own government agencies here at home, and among nations. Because any mission to Mars or similar venture is going to take the expertise, passion, and resources of more than one nation.

I'm the eternal optimist, but I am also a realist. We need to remain the leader in space exploration and the capabilities we are developing for those bigger missions, the commercial access to space – all of this will only strengthen our position as the world's space exploration leader.

Any security without growth and jobs is tenuous. As President Obama said in his State of the Union address, we're going to have to create an America built to last.

There's no doubt that NASA creates good jobs, helps inspire the next generation of science and technology leaders, and gives students hands on access to missions, spacecraft, and robotic design and many other experiences they can get nowhere else.

We've also placed a high priority on hiring veterans when they return from service. NASA is a natural fit for them. They've been flying vehicles, controlling UAVs, managing and repairing satellites, and analyzing data already. They know a lot about our nation's security needs, and we will need their skills to help us reach new heights in the decades to come.

We want them to translate what they've already done on the front lines of combat and military service to the front lines of creating a bright future for our nation's space program.

The technological benefits from an expansive 21st century exploration program will be considerable. But that exploration program also has a human face. It's all of you here today as well as the brave men and women who have sacrificed their lives to expand human potential. It's those who currently dedicate their lives and their passions to keeping us safe and make life better through space. They're the new astronaut class we just graduated, who will be the first to climb aboard those commercial rockets and perhaps the first to reach Mars. They're my granddaughters and the students to whom I spoke last week at Morgan State University who are passionate about science, technology, space, and aviation. They want to make the world a better place. It's up to us to pave the way for them and keep their dreams alive. I'm optimistic about their future and hope you share my passion and enthusiasm.